



Post-Shuttle Age: The Future of NASA

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Who am I?

- Historian of Science and Technology with particular interest in history of spaceflight
- Krige, Russo and Sebesta, *A History of the European Space Agency, 1960-1987* (2 vols, published by ESA , 2000)
- Krige, Long and Maharaj, *Conquest and Collaboration: 50 Years of NASA's International Collaboration in Space* (submitted to NASA for publication in December 2010)



Predicting the future

- “Dr Oppenheimer can you tell us what your thoughts are about what our atomic policy **should** be?”
- “No I can’t do that. I am not close enough to the facts, and I am not close enough to those who are worrying about it.”
- I can’t define a future for NASA. But I can draw lessons from the past, and the past history of human spaceflight in particular.



Take away message

- Human presence in space has never been a sufficient justification in itself for NASA to spend billions on the associated space transport systems that are needed to put people in space and to bring them back safely to earth again: it has always been justified **as a means to an end**
- → If the end is no longer there, or can be achieved more cheaply and safely, human spaceflight becomes difficult to justify



Looking at past rationale's ('the end') for human spaceflight: Apollo (the means)

- JFK, May 25, 1961, Address on 'Urgent National Needs':
- "Finally, if we are to win the battle that is going on around the world between freedom and tyranny, if we are to win the battle for men's minds, the dramatic achievements in space which occurred in recent weeks [Gagarin flight] should have made clear to us all, as did the sputnik in 1957, the impact of this adventure on the minds of men everywhere who are attempting to make a determination of which road they should take....



Justification for Apollo

- To win the space race with the Soviet Union with a spectacular demonstration of US technological prowess, and in so doing to win the hearts and minds of all those struggling to choose between freedom and tyranny

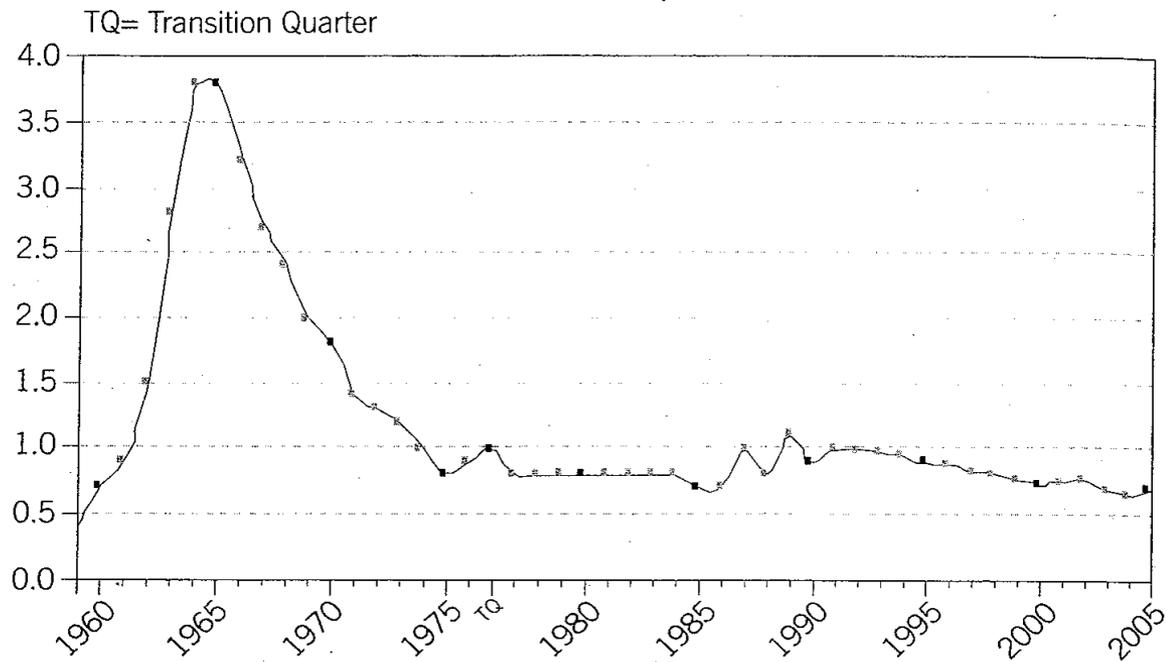


And when the race was won in July 1969?

- Memo to Nixon by White House aide Peter Flanigan, December 6, 1969
- “The October 6 issue of *Newsweek* took a poll of 1,321 Americans with household incomes ranging from \$5,000 to \$15,000 a year. This represents 61% of the white population of the United States, and is obviously the heart of your constituency. Of this group, 56% thinks the government should be spending less money on space exploration, and only 10% think the government should be spending more money.”

The result?

NASA Budget as a Percentage of Federal Budget

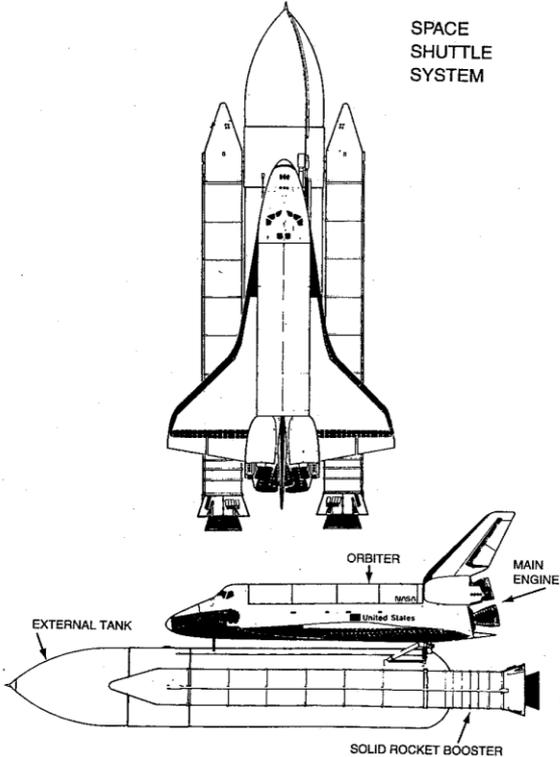




Looking at past rationale's ('the end') for human spaceflight: the Shuttle (the means)

- In 1972 the Shuttle was sold by NASA to President Nixon and to Congress on the grounds that it would reduce the cost/lb of payload into LEO by 90% (and eventually supply a space station)
- → The humans were on board to make it *reusable* as opposed to the usual expendable launch vehicles (ELVs)

SPACE
SHUTTLE
SYSTEM





Justification for Shuttle

- A cheap, safe and reliable way to put satellites into space, and eventually to construct and use a space station
- It was none of these: American launchers rapidly lost their monopoly on the western world's access to space, beaten out by Ariane



Human presence in space is imperiled today because of the..

- Technological hubris inside NASA: no cost effective and technologically feasible alternative to the Shuttle was developed inside NASA. Possible replacements for the Shuttle have been so far out technologically that their costs and risks exploded, and development was halted
- Technological conservatism of organized private-public coalition around the Shuttle (contractors, NASA centers, local and national government officials) who defend the multi-billion \$ Shuttle program that gives jobs in many states. It uses its influence to argue for modernizing and upgrading the existing system rather than to advocate programs to replace it
- Lack of funding: NASA's budget has been pegged at <1% of GNP for 30 years. President Obama's new budget for NASA leaves it to private industry, with limited help from NASA, to develop launch systems that can carry humans into space.



If the situation is to change in the post-Shuttle future...

- We need an argument for a human presence in space that will overcome the three 'drag' factors just defined
- We need to find an inspiring 'end' that will justify the 'means': an affordable, reliable system to maintain a human presence in space that can win Congressional support...



Alternative...think about the problem in an entirely new way

- Encourage American industry to develop and commercialize a launch system that makes a human presence in space commercially competitive with ELV systems.... President Obama's current plan